UPDM – Unified Profile for DoDAF/MODAF

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OMG OBJECT MANAGEMENT GROUP

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What is UPDM? - Summary

- UPDM is a standardized way of expressing DoDAF and MODAF artefacts using UML and SysML
  - UPDM is ***NOT*** a new Architectural Framework
  - UPDM is not a methodology or a process
  - UPDM 1.1 addresses DoDAF 1.5 & MODAF 1.2
  - UPDM 2.1 addresses DoDAF 2.0, MODAF 1.2 & NAF 3.x
- UPDM was developed by members of the OMG with help from industry and government domain experts.
- UPDM is a DoD mandated standard and has been implemented by multiple tool vendors.
  - Tools supporting UPDM are available now from Atego, IBM, No Magic and Sparx.

The Problem: Lack of Communication

- Defense is Deadly and Costly
  - Friendly fire cases in recent conflicts
  - NATO report citing lack of interchange of architecture costs lives
- Mainly caused by lack of communication
  - Between organizations and systems
  - Bad logistics
  - Wrong capabilities being delivered or not understood
- This results in costs not only to human life but also to governments in terms of developing the wrong thing in the wrong time frame
- UPDM helps to provide this communication and interchange

Why UPDM? - Benefits

- Innovate with a common data model
- Train once for the standard, once for the tool style, and then for the specific tool differences
- Build extensions on a core standard
- Reusable components across tools
- Third party tools can use common data
- Built on top of an existing hardware/software framework
- Interchange data across multiple tools

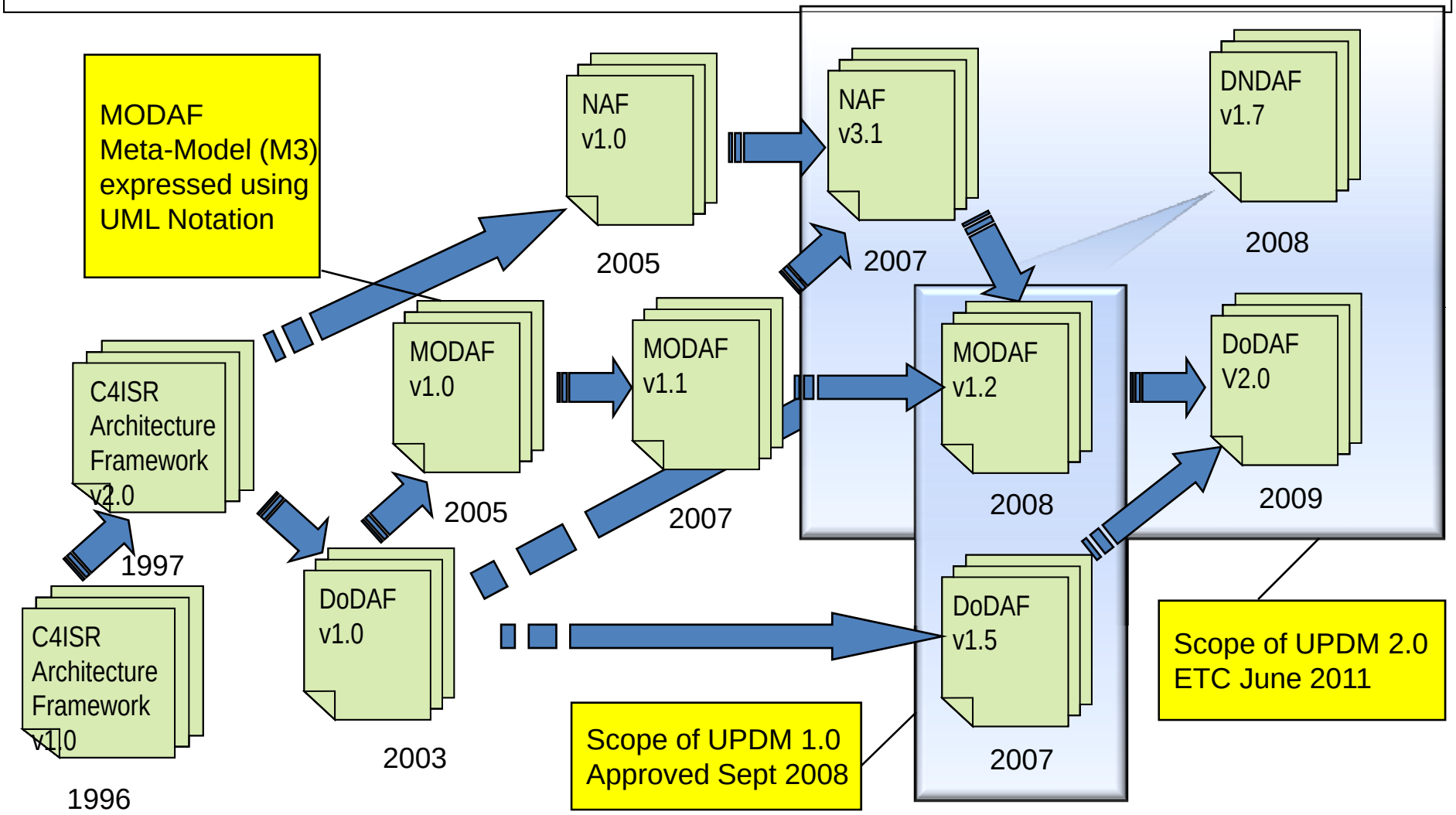
What does UPDM provide?

- UPDM Provides:
  - A standardized implementation by multiple tool vendors
  - Interchange
  - Definition of goals and capabilities
  - High level architecture: the context in which interchange will take place
  - Operational requirements
  - Operational functional rules
  - System specifications
  - System Interfaces
  - Protocol and standards compliance
  - Interaction specification and reporting
  - Performance characteristics and constraints
  - Trade-off analysis
  - Traceability to requirements and system implementation
  - Integration with parametrics
  - Etc.

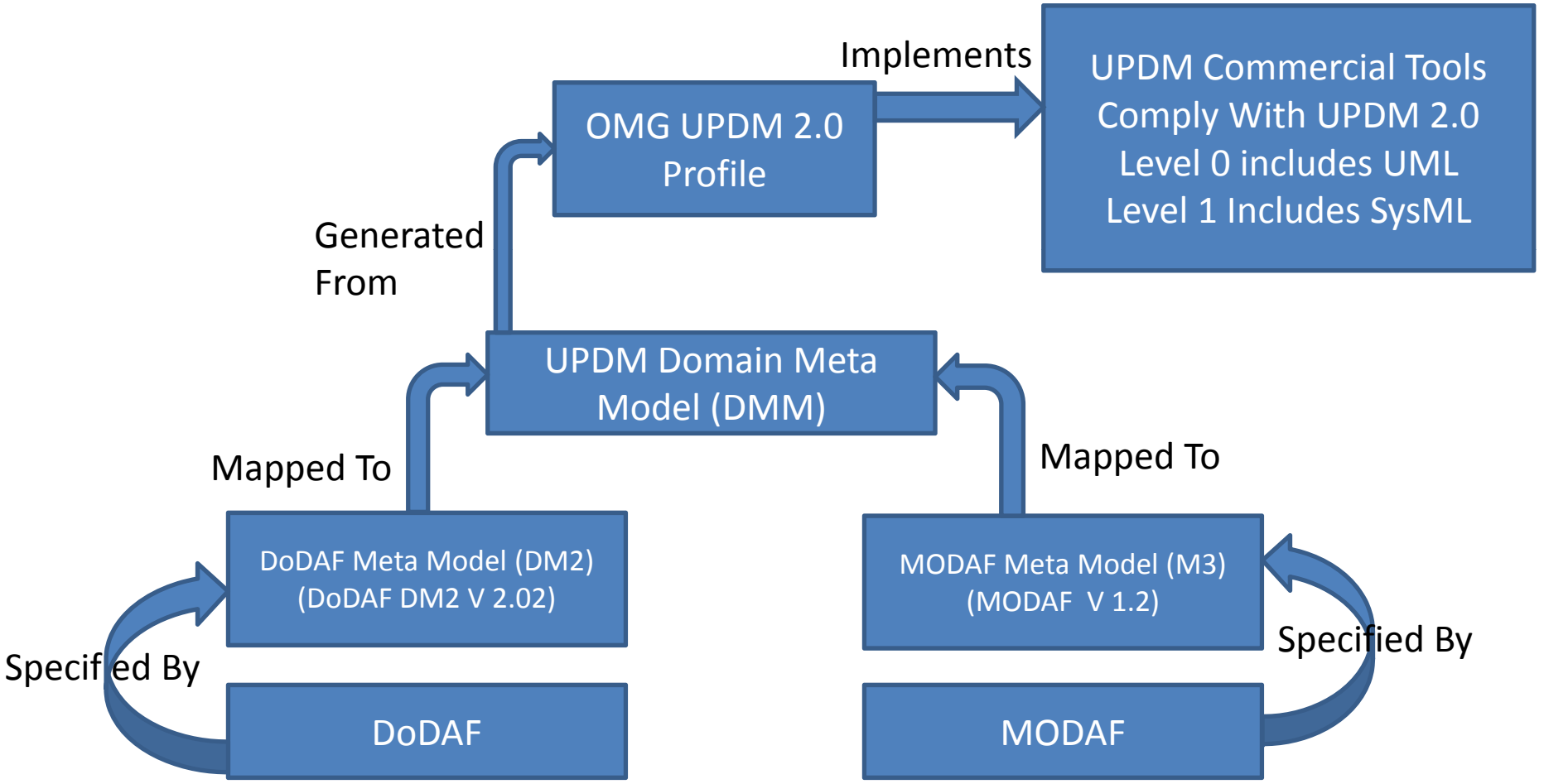
Why? The need for UPDM.

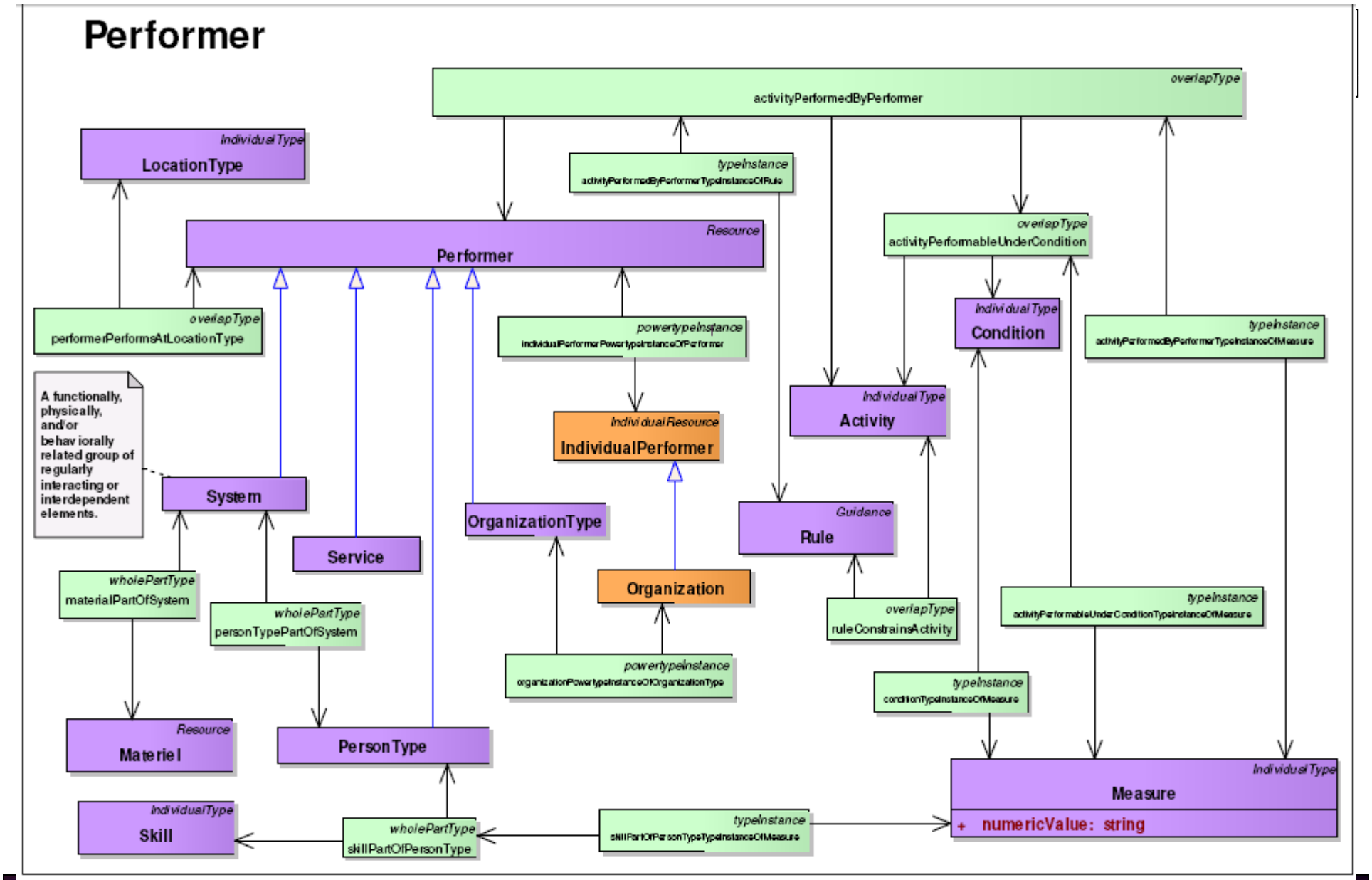
- Motivation
  - US DoD and UK MOD interested in leveraging commercial standards for their Military Architecture Framework
  - Military Architecture Framework Tool Interoperability
    - Key Goal for DoD, MOD, Enterprise and System Architects and Engineers
  - Formal MetaModel basis for the Military Architecture Framework
    - Critical to Interoperability Objectives
    - Critical to Understanding Profile Requirements
- Proliferation of Military Architectural frameworks
  - DoDAF, MODAF, DNDAF, NAF, AGATE, ADOAF, MDAF, etc.
  - Defence organizations, contractors and tool vendors hoping to find a way out of the alphabet soup.

Why and When: Historical Development of AF's.

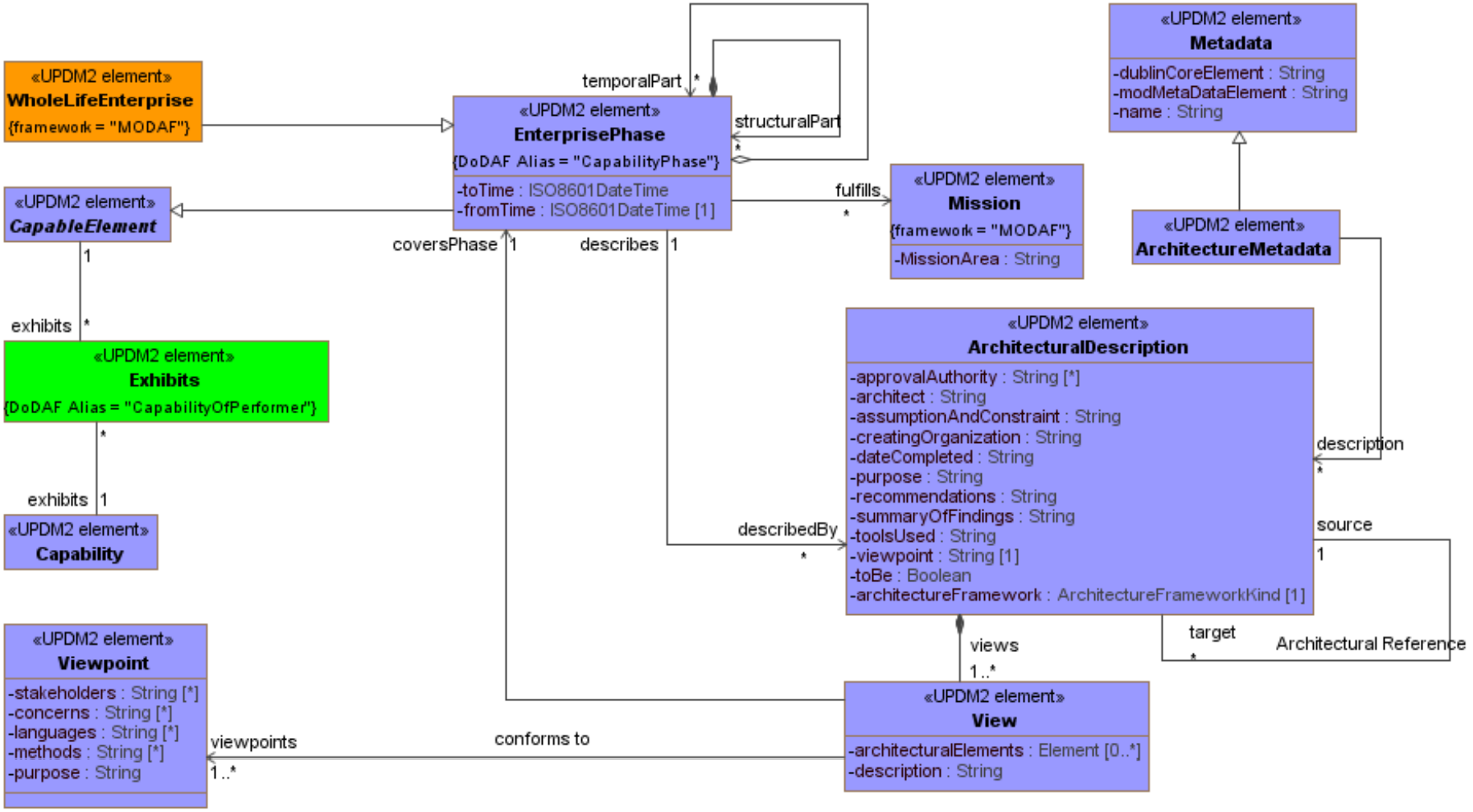


The Chain of Compliance, Conformance, & Inclusion

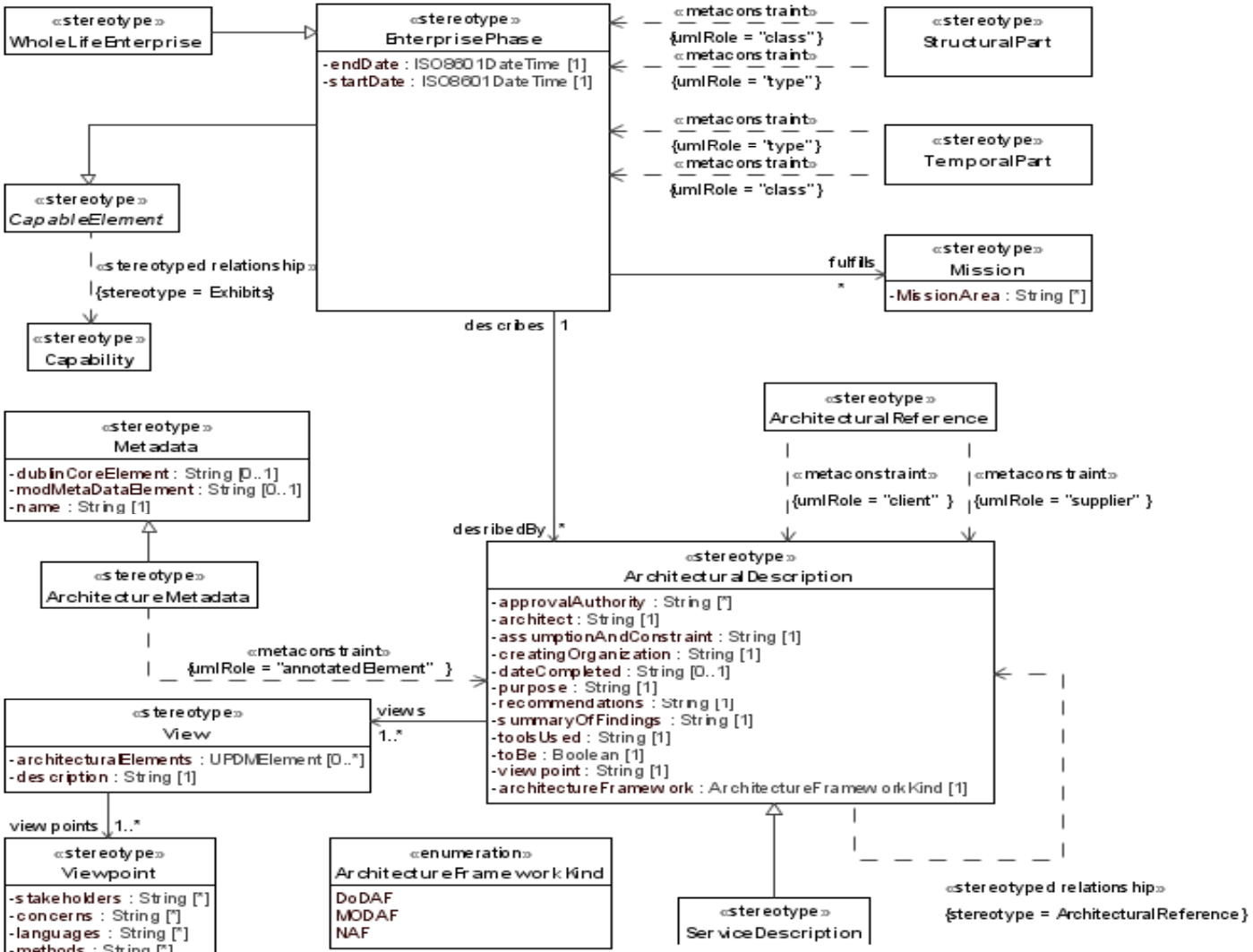



Performer
activityPerformedByPerformer
overlapType
IndividualType
LocationType
typeInstance
activityPerformedByPerformerTypeInstanceOfRule
overlapType
activityPerformableUnderCondition
Resource
Performer
IndividualType
Condition
typeInstance
activityPerformedByPerformerTypeInstanceOfMeasure
overlapType
performerPerformsAtLocationType
powertypeInstance
individualPerformerPowertypeInstanceOfPerformer
IndividualType
Activity
A functionally, physically, and/or behaviorally related group of regularly interacting or interdependent elements.
IndividualResource
IndividualPerformer
System
OrganizationType
Guidance
Rule
Service
wholePartType
materialPartOfSystem
Organization
wholePartType
personTypePartOfSystem
overlapType
ruleConstrainsActivity
typeInstance
activityPerformableUnderConditionTypeInstanceOfMeasure
powertypeInstance
organizationPowertypeInstanceOfOrganizationType
typeInstance
conditionTypeInstanceOfMeasure
Resource
Materiel
PersonType
IndividualType
Measure
+ numericValue: string
IndividualType
Skill
wholePartType
skillPartOfPersonType
typeInstance
skillPartOfPersonTypeTypeInstanceOfMeasure

UPDM RFC - Domain Meta Model Summary (AV)



UPDM RFC - Profile Summary (AV-1)



Interchange and interoperability

- Historically UML modelling tools used XMI which has led to integrations being developed as point to point solutions
- OMG Model Interchange Working Group (MIWG) developing common XMI interchange between UML tool vendors
- Eventually, both diagrams and data will be exchanged.
  - Diagrams can be re-created using the relationships captured within the XMI.

MIWG Results

- MIWG kickoff over 2 years ago (Dec ‘ 08)
- Finishing 16 test cases for UML and SysML
- General exchange capability demonstrated among vendors
- Vendors continue to update their tools to address interchange issues
- Refinements to UML spec identified to reduce ambiguity and correct errors
- Guidelines being established for vendor interoperability
- Test coverage reflects most *of the commonly used* UML/SysML features by end of Phase 2 Testing
- XMI interchange of models is now a reality
- Will be demonstrated at the end of this tutorial.

Who and Where: UPDM Team Members

- US DoD Liaison - DoD/DISA, OSD CIO, Mitre, Silver Bullet
- UK MOD Liaison - UK MOD, ModelFutures
- Canada DND Liaison – DND and ASMG Ltd
- NATO – Generic AB on behalf of SwAF and on contract by FMV
- Tool Vendors – Adaptive, Atego (Co-Chair), IBM (Co-Chair), Mega, NoMagic (Co-Chair), Sparx Systems, Visumpoint
- Aerospace – BAE Systems, General Dynamics, L3 Communications, Lockheed Martin, Northrop Grumman, Raytheon, Rolls-Royce, Selex SI, Thales, Unisys
- Advisors – Decisive Analytics
- Others 88solutions, Axway Software, Everware-CBDI, NIST
- Distributed multi national team (US, UK, France, Sweden, Lithuania, Australia, Canada, Thailand, Italy)

What: UPDM 2.1 Features

- Inclusion of DoDAF 2.0
- Continuing support for MODAF 1.2
- Support for NAF 3.1
- Support for DNDAF Information and Security views
- Architectural Patterns
- A gap analysis report was submitted on Human Factors Views based on MODAF, NAF and DNDAF

When: UPDM 2.x Roadmap

- UPDM 2.1 RTF charter in June 2011
- UPDM 2.1 RTF completion/submission in Dec 2012
- Submit UPDM 2.2 (3.0?) RFP Dec 2012
  - Expected target DoDAF 2.03
  - MODAF MODEM
  - DNDAF 1.7 may also be required by the Canadians
  - UML for BPMN profile
    - Allows the seamless integration of BPMN artefacts into a DoDAF Architecture along with an exchange environment
  - Others?
  - Priorities will be based on demand and participation
- UPDM 2.2 (3.0?) Submission December 2013

World-wide Adoption of UPDM

- Organizations within the following countries are investigating or have adopted UPDM.

- United States
- Great Britain
- France
- Sweden
- Canada
- Norway
- NATO
- Italy
- Holland
- Israel
- Australia
- India
- Germany
- Lithuania
- Etc.

- Current use of UPDM for non-military applications
  - Disaster planning, event planning, space missions: satellites, manned missions, non-military government departments, humanitarian relief operations, industry infrastructure planning, banking, European research project, medical, insurance, ground traffic management, air traffic management, rail, etc.

All of the above cited standardization and interchange as essential reasons for considering UPDM

Wider Use of DoDAF 2.0 and UPDM

- US OMB considering wider adoption of DoDAF 2.0 in federal Government
  - Fits in well with current use of UPDM in non-military applications
  - UPDM well placed in OMG to collaborate with Model for Performance-driven Government (MPG) group to create CA-FEA standard
  - Would require a name change for UPDM

Summary: Why UPDM?

- A standardized way to express DoDAF 2 architectures
  - UPDM is the only Standard that conforms not only with DoDAF but also with multiple Frameworks including MODAF and NAF
    - Communicate architectures across international boundaries
  - UPDM is a Standard under Configuration Management and Quality Control by the OMG.
    - Provides strong governance of UPDM development process
  - UPDM is a Standard that is freely available.
    - Any toolvendor can download it and implement the standard
  - UPDM is a Standard that developed by Tool Vendors with Real-World experience.
    - Provides a practical and pragmatic implementation of DoDAF 2.0 (something you can actually use)
  - UDPM is a Standard Mandated by the DoD for architectural guidance
    - A UPDM (conforming) Tool also conforms with DoDAF
  - Integration with OMG standards SysML, UML, SoaML, etc.
    - Provides flow-down, traceability, integration across sectors
    - BPMN integration is under development

Summary: Why UPDM?

- Standardized way to express DoDAF 2 architectures
- Executable Architectures
  - State based models
  - Activity models
  - Integration with analysis tools: Matlab, Modelica, Mathematica, etc.
- Extensibility
  - UPDM itself is an extension of UML and SysML
  - Fit For Purpose views can be easily added
- A UPDM Tool is testable for Interchange of Data and Models by the OMG
  - XMI provides data interchange
  - Diagram interchange in the future
  - Prevents vendor lock-in – supported by several tool vendors
  - Promotes collaborative technologies and tools

Discussion

Questions?